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I, JULIE BILLINGSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2003905500 for a patent by STEVEN KENESSEY as filed on 08 October 2003.



WITNESS my hand this
Sixth day of August 2004

J. Billingsley

JULIE BILLINGSLEY
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**AUSTRALIA**
**Patents Act 1990**

Provisional SPECIFICATION
# PROVISIONAL APPLICATION for a Patent

BIO POWER TOWER – power generator using heat from the sun, the wind and from buildings as well as using power converted from waste matter in urban environments.

The following statement is a full description of this invention, including the best method of performing it known to me:

# BIO POWER TOWER
## Provisional Patent

### Applicant and designer: Steven Kenessey

This application is an extension of a previous application for a provisional patent titled "Eco Tower" by the same designer.
Much of the contents of this application was covered in the previous application mentioned above titled "Eco Tower" and has been included as it relates to the additional aspects to this same invention.
The eco tower is normally one or a combination of various aspects with the purpose of creating air movement that can be converted into electricity, as well as, if desired, exhaust polluted air from urban environments and also if desired, purify downward moving air. + other environments.
The Bio Tower may be built at any appropriate scale.
A small scale, wind driven version of the spiral tower may be used to pump air.

As was stated in the said previous application, the Eco Tower may preferably be used to exhaust used air and generate electricity from places such as city centres by utilising heat from air conditioning systems in surrounding buildings and/or from the sun's energy and/or by harnessing the energy of the wind. Preferably the eco tower will incorporate all three methods simultaneously in such a way that they will augment each other. This current application adds the additional aspects to the same invention including:
-conversion of waste material (mostly sewerage and waste paper and other organic waste) into bio gas (consisting mostly of methane gas) and into heat and into fertilizer. The heat released by any of these processes may preferably be used to augment the system.
-the bio gas thus created may then be stored and used to power direct fuel cells, which produces heat and electricity. The heat generated in this process may be used to augment the functioning of the eco tower and the electrical power generated may preferably be used to augment the electrical power output of the eco tower's turbines as well as provide electrical power when the electrical output of the same turbines is low,
-use of heat generated by the breakdown of sewerage and organic matter into fertilizer to augment the system,
-use of impurities extracted from the air for use in sewerage converter,
-use of heat from roadways and other heat absorbing surfaces, especially those surfaces that tend to trap and contain the heat of the sun, to augment the functioning of the eco tower.
-use of heat from tunnels especially underground railway tunnels, motor vehicle tunnels and other heat absorbing or generating sources, to augment the functioning of the eco tower.

Also preferably, when the system is used in conjunction with a landscaped (flora covered) interior portion of the tower, which is preferably configured in a spiral formation, air may be drawn into the tower by the cooling process associated with the extraction of the heat from the water gathered from the air conditioning systems (and other heat generating sources) from surrounding buildings, tunnels, road surfaces etc. and, in so doing, the air may be oxygenated and purified and the impurities captured by the process of cooling the said water may be fed into the landscape and thus filtered. This same process may be cycled two or more times to cool the water to the desired temperature and to augment the downward flow of air. If the system is so configured so as to create low air pressure at the base of the eco tower for use in drawing air down the tower, the aforementioned system, utilizing air temperature differential to cause a downward flow of air down the landscape, may thus be augmented or substituted.

Each of these above systems preferably may be used together in such a manner so as to augment the functioning of entire system in total. They may also be used as separate systems or in any combination.

<u>The Heat Chimney</u>
One system (the heat chimney) utilises the heat exhausted from air conditioning systems, gathered from heat absorbing surfaces, tunnels and other heat sources and uses it to create an updraft of air in tower, which may be harnessed with the use of air driven turbine generators either within the tower or within or connected to the air intake of the tower supplying the updraft of air within the tower. This system may be used as a separate system. As well as generating electricity it may also be used to exhaust dirty or used air from urban areas in close proximity to buildings with mechanical air conditioning systems or other heat sources. Also preferably the tower

may be incorporated with other functions. For example it may also be use as a look out tower with restaurants and other recreational or tourist facilities.
Also the system may preferably be incorporated into the design of an office tower or other building form, the chimney being used in the core of the building and preferably in conjunction with the lift shaft.
Also the system may preferably be incorporated into the design of an office tower other building form, the chimney being connected to the exterior of the same building and preferably clad in glass so maximize heat gain from the sun.
Preferably this system will be used help to prevent the build up of heat around major cities (commonly known as the heat island effect) by extracting heat from buildings and other heat sources and releasing the same heat in the said heat chimney and venting it in the upper atmosphere above the city and preferably generate electricity for the city in the same process. The electricity may preferably be connected to the existing electrical power system (commonly known as the power grid).

The Heat Chimney may extend from under the ground to well above the ground. The higher the chimney the more effective it becomes. The chimney may be entirely built under ground if required or may extend from the top of a structure and reach higher.

Heat trap
The second system (the heat trap system) relies on the heat of the sun to generate hot air within the tower. It collects the sun's heat by trapping the heat of the suns rays within an air cavity between two layers of glass. The external layer of glass allows the heat from the suns rays to pass through it from the outside to the inside, however it prevents the majority of the same heat from passing through the same glass from the inside to the outside atmosphere. Once the heat from sun's rays pass through the air cavity, the majority of it is prevented from passing through the second layer of glass with reflects the same heat radiation and thus retains the heat within the same air cavity, effectively trapping the heat.
Preferably this same heat trap may be incorporated into the outer façade of the said eco tower, which preferably is configured to incorporate the spiral cavity aspect of this invention and the same heat trap system may also be incorporated into a glass roof structure at the base of the said tower and connected to it in such a way that the heat may flow from the heat trap cavity in the glass roof into the heat trap cavity in the façade of the tower (which may also function as a spiral cavity and thereby augment the system.
Preferably this same heat trap may be incorporated into the outer façade of a preferably tall building and the same heat trap system may also be incorporated into a glass roof structure at the base of the same tower and connected to it in such a way that the heat may flow from the heat trap cavity in the glass roof into the heat trap cavity in the façade of the tower and thereby augment the system. This form of the invention relies on the heat trap cavity around the perimeter of the building to act in a similar way as the said "heat chimney" in that it forms the stack containing the updraft of warm air. It has the additional benefit of allowing heat into the building whilst filtering out most of the radiant heat from the sun. This aspect of the invention can be added to existing buildings or incorporated into the design of new buildings and it can be used to augment the ventilation of the building to which it is incorporated with as the updraft within the façade cavity may be accessed from the interior spaces of the same building with vents that promote the functioning of the so called Venturi effect which may be used to draw air from the building into the updraft in the cavity. If the suction created by this aspect of the invention was used to draw air into the same space via a cooling area such as a landscaped space or a space filled with air born water such as a waterfall or a fine mist spray, or other cooling and preferably purifying system the said invention also be used to regulate the air temperature in a building in such a way as to minimize the need for mechanical air conditioning. As the invention may be used to prevent most of the suns radiant heat from entering a building the need for air conditioning to remove heat greatly alleviated. The energy saved by this aspect of the invention can thus be largely conserved for the generation of electricity and a higher proportion of external air may preferably be allowed into the building creating a healthier environment.

Preferably this same heat trap may also it may be incorporated into a glass roof structure at the base of the said heat chimney aspect of this invention. The glass roof would be ideal for providing shelter over a large public square as it would allow the sun's light to illuminate the space whilst preventing excessive heat build up as well as making the space usable during times of wet or inclement weather. The heat trapped within the roof cavity would flow into and augment or completely supply the air rising in the chimney, which would preferably be made of glass, which allows the majority of the sun's radiant heat into the chimney but not out and thus increasing the heat absorbing capacity of the system. Preferably the heat from all available heat sources (such as air conditioning systems, road surface heat, underground tunnel heat etc.) should be released into the same chimney. In this way heat from air conditioning systems, road surfaces and other sources of heat as well as heat directly captured by the invention from the sun is combined within the one chimney to create rising air. This rising air may preferably be

utilised to drive generators to generate electricity and extract dirty and polluted air preferably from the street level of the city and from tunnels.

Spiral cavity

The third method of generating an updraft within the tower is to form a spiral formation in the façade of the tower in such a way as to gather the wind flowing around the tower and direct it into a spiral cavity following the shape of the spirally formed façade, and thus forcing the wind up the spiral cavity drawing air behind in from within the cavity. The spiral façade preferably should allow air into its cavity and not out, in this way the air pressure caused by the wind entering the spiral cavity will force air up the spiral cavity as it can only escape from the top of the tower.

Preferably the tower will incorporate all three methods of creating an upward movement of air in such a way that they will augment each other. Preferably the spiral cavity will be divided into two sections; an upper and a lower section along its length. The upper section may be open to the external atmosphere and would use flaps, valves or other devices, which may preferably be computer controlled and, in most instances, be used to allow wind to be drawn into the upper section and prevent the same wind from exiting the upper section unless the same wind is nearing the top of the tower. As the air flows up the tower, low air pressure would be created at the base of the tower drawing air through air intake device(s) and/or through a sun heated air cavity type "Heat Trap" in a glass roof at the base of the tower.

The lower section of the said cavity would preferably be divided from the upper section with the use of flaps, valves or other devices, which preferably may be computer controlled and, in most instances, be used to allow air to be sucked into the upper section from the lower section and prevent the same wind from returning into the lower section. The lower section is preferably to be connected to the air intake of the tower, which would preferably be at its base and therefore may form the means to supply air to the upper section along its entire length via the said flaps, valves or other devices.

The air from the lower section of the said cavity may be drawn into the upper section of the said cavity by one or both of two means. In the first means air would be drawn into the upper section when the air pressure in the said upper section is lower than the air pressure in the said lower section, thus causing air to flow from the lower to the upper section of the spiral cavity in order to equalise the air pressure. The differential in air pressure between the upper and the lower section would be caused by the movement of air up the spiral cavity creating lower air pressure in the upper section the closer it is to the base of the tower. Also, wind may preferably be prevented from entering the upper section of the same cavity in the area close to the base and this should preferably be regulated by computer or (other means) in such a way as to maximise the updraft and sucking power caused by the wind within the spiral cavity.

The centrifugal force acting on air may also cause a differential in air pressure as it moves upward in a spiral formation causing greater air pressure at the outer perimeter of the upper section of the spiral cavity. Preferably the valves, flaps or other devices that divide the upper section from the lower section should be used to allow air to flow from the lower section into the upper section where the air pressure differential is at its greatest (i.e. where it is closest to the inner core).

The second means by which the air may be drawn from the lower section into the upper section of the spiral tower is by a method that makes use of the 'Venturi effect', in which the flow of air past a opening draws air into the same opening and into the slipstream of the air. The flaps, valves or other devices that separate the upper section from the lower section may preferably also be used to draw air from the lower section into the upper section of the spiral cavity by maximising the said 'Venturi effect'. This effect, set up when air flowing in the upper section passes over the openings that separate it from the lower section, should preferably be regulated by computer controls or by other means in order to achieve maximum updraft when required.

The wind-inducted movement of air up the spiral cavity of the tower would naturally be dependant on the velocity of the surrounding wind and therefore be sporadic. The same upward air movement in the tower would also be augmented by the upward movement of hot air (hot air being air that is hotter than the outside atmosphere). The heat chimney method of generating hot air together with the heat trap method will cause air to flow up the spiral cavity of the tower regardless of the wind velocity. This system may also preferably incorporate a vertical shaft that connects the upper spiral cavity at the base of the tower to the lower spiral cavity near the top of the tower providing two ways for the air to flow and depending on a combination of all the conditions, will flow in the direction of the lowest air pressure. As valves, flaps or other devices will preferably be positioned between the vertical shaft and the upper spiral cavity along its length the system may further be augmented by a flow of air between the vertical shaft and the upper spiral cavity when appropriate. When the pressure differential between the upper spiral cavity and the vertical shaft is big enough it will cause air to be sucked into the upper spiral cavity from the vertical shaft and thus increase the velocity of the air movement up the vertical shaft. Preferably this

vertical shaft should be positioned close to the core and preferably surround the core in this way the centrifugal forces acting on the air flowing up the spiral cavity may be harnessed to induce increase updraft in the vertical shaft.

Also preferably the system may be used with a plants and vegetation (an interior landscape) established in the core of the building and so configured so as to purify and oxygenate the incoming air and preferably further direct the air to provide a healthy atmosphere for people close by (for example in a large public space or park that may be covered with the said glass roof structure). This interior landscape may preferably be configured in a spiral formation with air, entering from the upper reaches of the tower and flowing down the landscaped spiral, being cooled by the landscape as it flows – the cooling effect promoting the downward flow. Preferably, the cooling effect may be augmented by using the spiral tower to cool water piped from the air conditioning units from surrounding buildings (especially office towers). The by-product of extracting the heat from the water of air conditioning systems is cooled water. As previously mentioned the water would be used in the outer cavities of the tower to promote updraft and the cooled water, in the form of a fine mist spray, would irrigate the landscape. After filtering through the landscape the same water would be piped back into the air conditioning systems from where they originated and thus completing the cycle.

Preferably, the inner spiral is a stepped landscape, which purifies air entering from above. Flora may preferably be incorporated into a spiral configuration. The evaporative effect caused by the plants and their irrigation system, cools the air and causes it to flow down the spiral like a river drawing air from above. Plants detoxify and oxygenate the air, which is delivered into public spaces, habitable areas and the like, and preferably pushing used air up and out. The water directed from the cooling towers of surrounding air conditioning plants may preferably be used to help irrigate the plants by creating a fine mist spray over the pants in the central spiral. The heat released through this method rises and may be directed via computer regulated passages into the outer cavity of the structure, which is itself formed into a double spiral and with the appropriate glazing will become a heat trap causing the upward movement of hot air and regulating the heat gain in the inner spiral. The shape of the façade of the structure, with the use of computer regulated flaps, may preferably be used as a wind scoop - capturing the winds and forcing the air to spiral upwards within the tower. An adjacent and lower spiral cavity forms the air intake of the system. The vacuum created by the upward movement of air in combination with a computer regulated "Venturi effect" acting along the entire length of the double outer spiral cavity creates an enormous air pump augmented by the heat released from surrounding buildings via their air conditioning systems within the inner spiral. The suns heat trapped in the outer spiral cavity also may be used to augments the system.

Depending on its size, this system may go a long way towards alleviating the "heat island effect" which threatens most major cities. On still days when there is little breeze to blow away the hot air, the tower, by delivering a large amount of heat high above the city to a single point, will conceivably create a bubble of hot air that will push upward and in effect pierce the bubble of warm air surrounding the city and induce an upward movement thus "draining" the air into the upper atmosphere.

The inner spiral is a stepped landscape, which purifies air entering from above. The evaporative effect caused by the plants and their irrigation system, cools the air and causes it to flow down the spiral like a river drawing air from above. The water directed from the cooling towers of surrounding air conditioning plants may be used to help irrigate the plants by creating a fine mist spray over the pants in the central spiral. The heat released through this method rises and may be directed via computer regulated passages into the outer cavity of the structure, which is itself formed into a double spiral and with the appropriate glazing will become a heat trap causing the upward movement of hot air and regulating the heat gain in the inner spiral. The shape of the façade of the structure resembles an unfolding leaf which, with the usé of computer regulated flaps, becomes a giant wind scoop - capturing the winds and forcing the air to spiral upwards. An adjacent and lower spiral cavity forms the air intake of the system. The vacuum created by the upward movement of air in combination with a computer regulated "venturi effect" acting along the entire length of the double outer spiral cavity creates an enormous air pump augmented by the heat released by the landscaped inner spiral and the suns heat trapped in the outer spiral cavity.

Methane from Sewerage and other Organic Waste

As so called waste products are a valuable resource the current invention offers a means by which to harness sewerage, paper and other organic waste by combining it with the heat waste of air conditioning systems and, if necessary, the heat from other sources in order to produce electrical energy, gas and fertilizer.
This is made possible due to the fact that sewerage and much organic waste, produce bio gas (consisting mostly of methane gas) when undergoing decomposition under suitable conditions. For this process to occur in a quick

and expedient manner it is preferable that the sewerage and other organic waste be kept at a temperature of approximately 35 degrees Centigrade in sealed containers.
The water discharged from mechanical air conditioning systems commonly used in office towers and the like is normally at a temperature of 35 degrees Centigrade before it is cooled, which is an appropriate temperature for use in promoting the decomposition of sewerage and other organic waste. Preferably the said sewerage should be contained in gas extraction mechanisms and kept at the appropriate temperature preferably with the use of heat transferred from the said air conditioning systems and/or other sources of heat and transferred to the same sewerage and other organic waste with the use of appropriate heat exchange systems and the process of gas extraction thus facilitated. Once the sewerage and other organic waste commences decomposition the heat exchange systems are only needed to maintain the most appropriate temperature and if the process of decomposition causes an increase in temperature that is too high for the most efficient functioning of the system as a whole, the excess heat may be extracted preferably by the same heat exchange system and used to augment the functioning of the eco tower.
The gas should preferably be extracted from the same sewerage and other organic waste and should preferably be stored in pressurised tanks for later use.
After the methane and other gases have been extracted from the sewerage and other organic waste the material should preferably be transferred to another containment area and the heat suitably extracted (preferably during its normal cooling process) for use in augmenting the functioning of the eco tower.

The sewerage (post methane extraction) in the said containment area should preferably be converted to fertilizer with the use of suitable worms, suitable microorganisms and suitable bacteria and generally kept in the right conditions to promote conversion to fertilizer. Preferably the same containment area should be of an appropriate depth and size to allow the build up of heat during the conversion process, the excess of which should preferably, if feasible, be extracted with an appropriate heat exchange system and used to augment the functioning of the eco tower.

Direct Fuel Cell

Preferably this invention may be further augmented by the use of so called "direct fuel cell" technology, which has the capacity of converting gas such as methane into heat and electricity without the use of combustion. It does this with the use of a chemical process. As part of the process the said methane is converted into hydrogen, which becomes the fuel for the said direct fuel cell. As heat is a by-product of this process the same heat may preferably, be used by the eco tower to augment the system. The electricity produced will preferably be used to augment the electrical out put of the turbine generators incorporated in the eco tower and/or be connected to the electrical power grid or system of the region in which the tower is build.

In general the transfer of excess heat from the various processes that are carried out as part of the eco tower system may preferably be achieved with the use of a heat exchange system, which preferably incorporates water as its medium if an evaporative heat exchange system is incorporated for the release of heat into the tower. For example, the heat released by the said fuel cells may be released into to the eco tower by the use of an appropriate heat transfer mechanism, which may utilise the passage of water in pipe work in which the same water is used to absorb the heat produced by the said fuel cells and then pumped through preferably well insulated pipe work before being passed through an appropriate heat extraction system such as an evaporative water cooling system, which, via the creation of a fine mist spray, releases heat from water which is carried aloft by the updraft within the eco tower. If this process does not reduce the temperature of the water to the optimum temperature required to run the system, the same cooling system may be repeated at a lower level in the tower.

Methane Conversion into Hydrogen

In order to further promote clean environments, the methane produced by the eco tower may be used to run cars or may be converted into hydrogen or other appropriate gas and used to run motor vehicles. If feasible the methane gas may be converted into hydrogen during times when the output of the tower is not being fully utilized and the excess energy is better spend on other internal functions such as gas conversion.

Energy Collectors

As mentioned in the Heat Chimney description of this specification, much of the heat used to power the eco tower may preferably be collected from various sources according to this invention. These sources are preferably close enough to allow the heat to be transferred to the eco tower using whatever means are feasible and practical.

The said heat sources may include from the heat extracted from buildings using mechanical air conditioning systems, the heat from road surfaces, the heat from concrete and other masonry surfaces, the heat from tunnels, the heat from motor vehicles, the kinetic energy from motor vehicles and any practical means of gathering energy that may be used to augment the functioning of the eco tower. For example, as roadways are normally dark in colour, they tend to absorb the heat of the sun. This same heat is stored in the mass of the road surface and in its substratum. This same heat may be transferred to the eco tower by various meansincluding the use of piped water embedded below the surface of the road configured in a manner to facilitate the absorption of the said road heat into the water within the pipe work. The same water may preferably be pumped to the eco tower and cooled so that the heat contained within the water is released into the chimney of the eco tower before being preferably recirculated.
The said pipe work may be installed into the road surface by cutting grooves into the same surface, laying the said pipe work into the same grooves and connecting the pipe work to the eco tower preferably so that the water may be recirculated after the discharge of heat into the tower. The pipe work embedded thus forms a type of heat exchange system that may progressively be installed into an urban environment.
The energy required to circulate the water from the said road surfaces to the eco tower may preferably be generated by the vehicles travelling upon the same road. One possible method for achieving this aim is to use pressure operated mechanisms built into the road surface, which has the capacity to pump water. This may be achieved with the use of one way valves or the like that allow water to pass in one direction and not the other. If water is squeezed out of the mechanism when a car drives over it, the water may travel in one direction and when the same pressure is released, new water may enter the mechanism ready to be pumped by the weight of another vehicle. Preferably the pumping device would be computer controlled to maximize the efficiency of the entire system as is the case for all the various aspects and operable parts of the invention.

An appropriate version of the eco tower may be powered primarily from the heat gathered road surfaces and used anywhere in practical proximity to road surfaces for the generation of electricity and/or for the ventilation of tunnels, for example.

Heat may also be gathered from tunnels and discharged into the eco tower. A similar heat exchange system as described for used with road surfaces may also be used which transfers the heat gathered with the use of water. As the heat of tunnels may also be vented directly into the eco tower, the same heat exchange system may be used to cool air in the tunnel that is required to travel within a downward sloping tunnel in order to vented into the chimney of the eco tower. The eco tower may therefore use more than one method of extracting heat from a heat source and preferably the two methods will complement each other.

Water pipes cast in concrete also may form another form of heat exchange, which may be especially suitable for removing heat from surfaces in urban environments that are warmed by the sun. Preferably the water pipes would be so configured so as to allow the circulation of the water between the eco tower on the source of the heat in such a way as to maximize this heat exchange.

Any feasible means may be used to transfer heat from an appropriate energy source to the eco tower, especially if that energy source was problematic as is the case with heat exhausted from air conditioning systems.

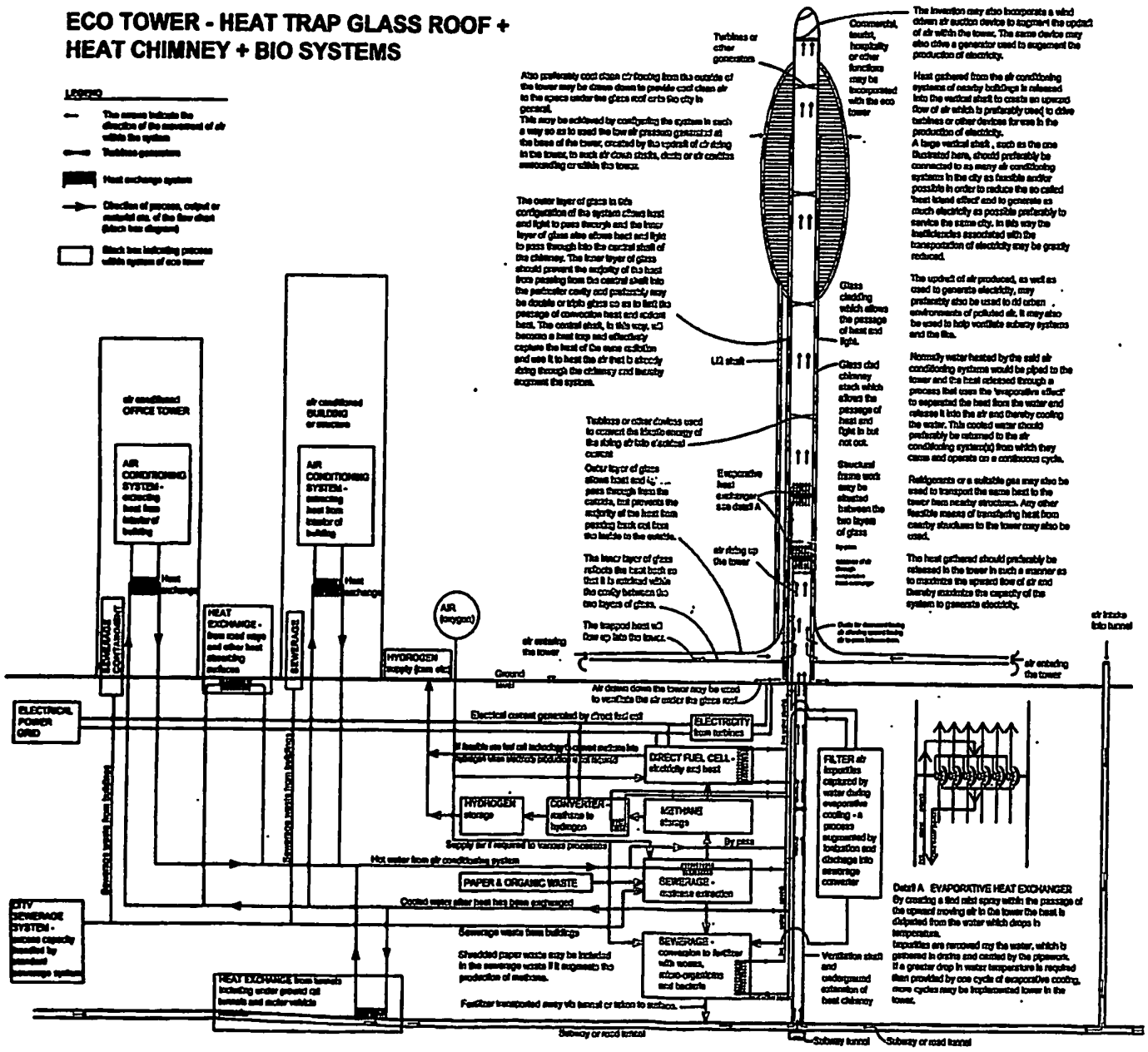
Microwave technology for example may prove a good way to transfer energy into the eco tower for example. Energy may be beamed to the tower from any practical place including from satellites which may convert the sun's radiant energy into microwaves that may preferably be beamed to the top of the eco tower which should preferably be as high as possible to avoid as many birds as possible. Extraneous electromagnetic radiation may be gathered and send to the eco tower via micro wave technology for example.

All of the above configurations and systems or any combination of the above systems may be integrated with subways and/or road tunnel systems in order to ventilate them and used the heat exhausted from them to augment the above mentioned systems. In this way the heat generated from motor vehicles, trains and other equipment as well as people may be used to preferably generate electricity and preferably promote the entry of clean air into urban and other environments.

Diagram

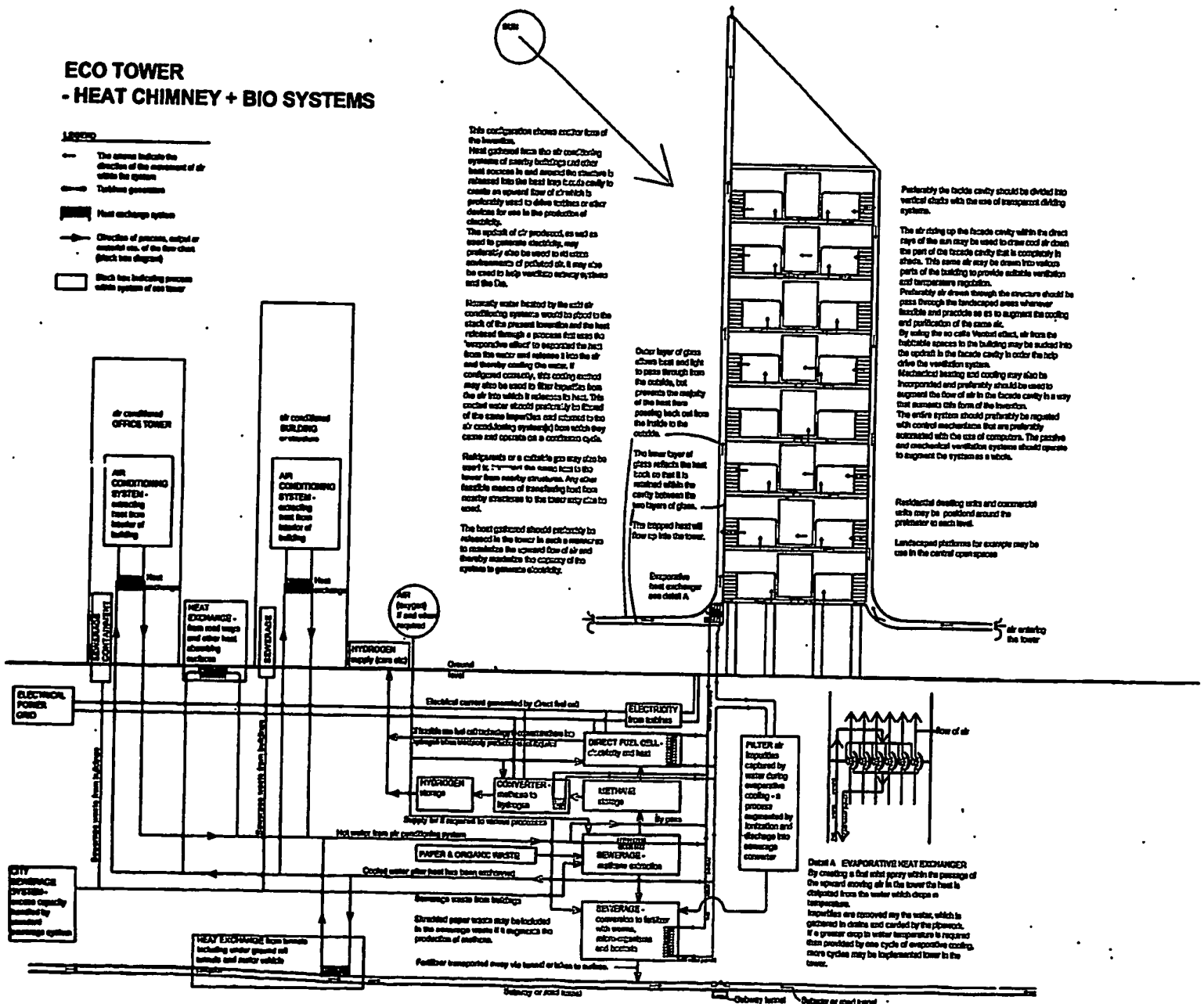
The following diagrams show one example of a schematic layout of the present invention. It should be realised that the forms of the invention described and illustrated are non-limiting.

# ECO TOWER - HEAT TRAP GLASS ROOF + HEAT CHIMNEY + BIO SYSTEMS




SCHEMATIC BLACK BOX LAYOUT OF BIO FUNCTION RELATED TO CONCEPTUAL SECTION OF THE TOWER

# ECO TOWER
# - HEAT CHIMNEY + BIO SYSTEMS




This configuration shows another form of the invention.
Heat gathered from the air conditioning systems of nearby buildings and other heat sources is and around the structure is released into the heat trap facade cavity to create an upward flow of air which is preferably used to drive turbines or other devices for use in the production of electricity.
The updraft of air produced, as well as used to generate electricity, may preferably also be used to aid extra environments of polluted air. It may also be used to help ventilate subways, trains and the like.

Normally water heated by the exit air conditioning systems would be stood to the stack of the present invention and the heat released through a process that uses the 'evaporative effect' to transfer the heat from the water and release it into the air and thereby cooling the water. If configured correctly, this cooling method may also be used to filter impurities from the air into which it releases its heat. This cooled water should preferably be freed of the same impurities and returned to the air conditioning system(s) from which they came and operate on a continuous cycle.

Radiopanels or a suitable gas may also be used to transfer the waste heat to the tower from nearby structures. Any other feasible means of transfering heat from nearby structures to the tower may also be used.

The heat gathered should preferably be released in the tower in such a manner as to maximize the upward flow of air and thereby maximize the capacity of the system to generate electricity.

Preferably the facade cavity should be divided into vertical ducts with the use of transparent dividing systems.

The air rising up the facade cavity within the direct rays of the sun may be used to draw cool air down the part of the facade cavity that is completely in shade. This same air may be drawn into various parts of the building to provide suitable ventilation and temperature regulation.
Preferably air drawn through the structure should be pass through the landscaped areas wherever feasible and practical so as to augment the cooling and purification of the same air.
By using the so calls Venturi effect, air from the habitable spaces to the building may be sucked into the updraft in the facade cavity in order the help drive the ventilation system.
Mechanical heating and cooling may also be incorporated and preferably should be used to augment the flow of air in the facade cavity in a way that suments this form of the invention.
The entire system should preferably be reguated with control mechanisms that are preferably automated with the use of computers. The passive and mechanical ventilation systems should operate to augment the system as a whole.

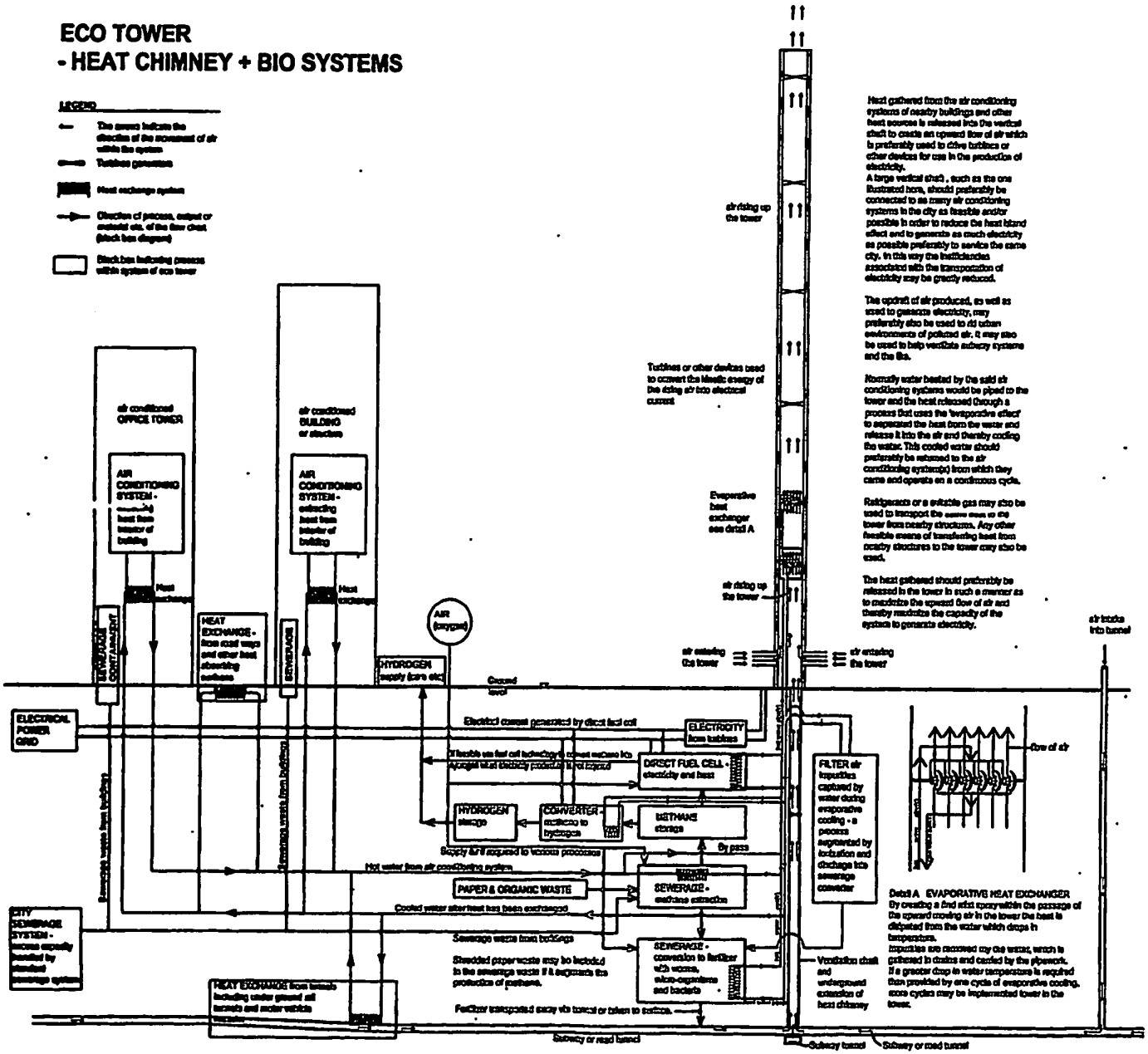
Residential dwelling units and commercial units may be positiond around the prelmeter at each level.

Landscaped platforms for example may be use in the central open space

Detail A EVAPORATIVE HEAT EXCHANGER
By creating a fine mist spray within the passage of the upward moving air in the tower the heat is dissipated from the water which drops in temperature.
Impurities are removed my the water, which is gathered in drains and carried by the pipework.
If a greater drop in water temperature is required than provided by one cycle of evaporative cooling, more cycles may be implemented lower in the tower.

SCHEMATIC BLACK BOX LAYOUT OF BIO FUNCTION RELATED TO CONCEPTUAL SECTION OF THE TOWER

# ECO TOWER
# - HEAT CHIMNEY + BIO SYSTEMS




Heat gathered from the air conditioning systems of nearby buildings and other heat sources is released into the vertical shaft to create an upward flow of air which is preferably used to drive turbines or other devices for use in the production of electricity.
A large vertical shaft , such as the one illustrated here, should preferably be connected to as many air conditioning systems in the city as feasible and/or possible in order to reduce the heat island effect and to generate as much electricity as possible preferably to service the same city. In this way the inefficiencies associated with the transportation of electricity may be greatly reduced.

The updraft of air produced, as well as used to generate electricity, may preferably also be used to rid urban environments of polluted air. It may also be used to help ventilate subway systems and the like.

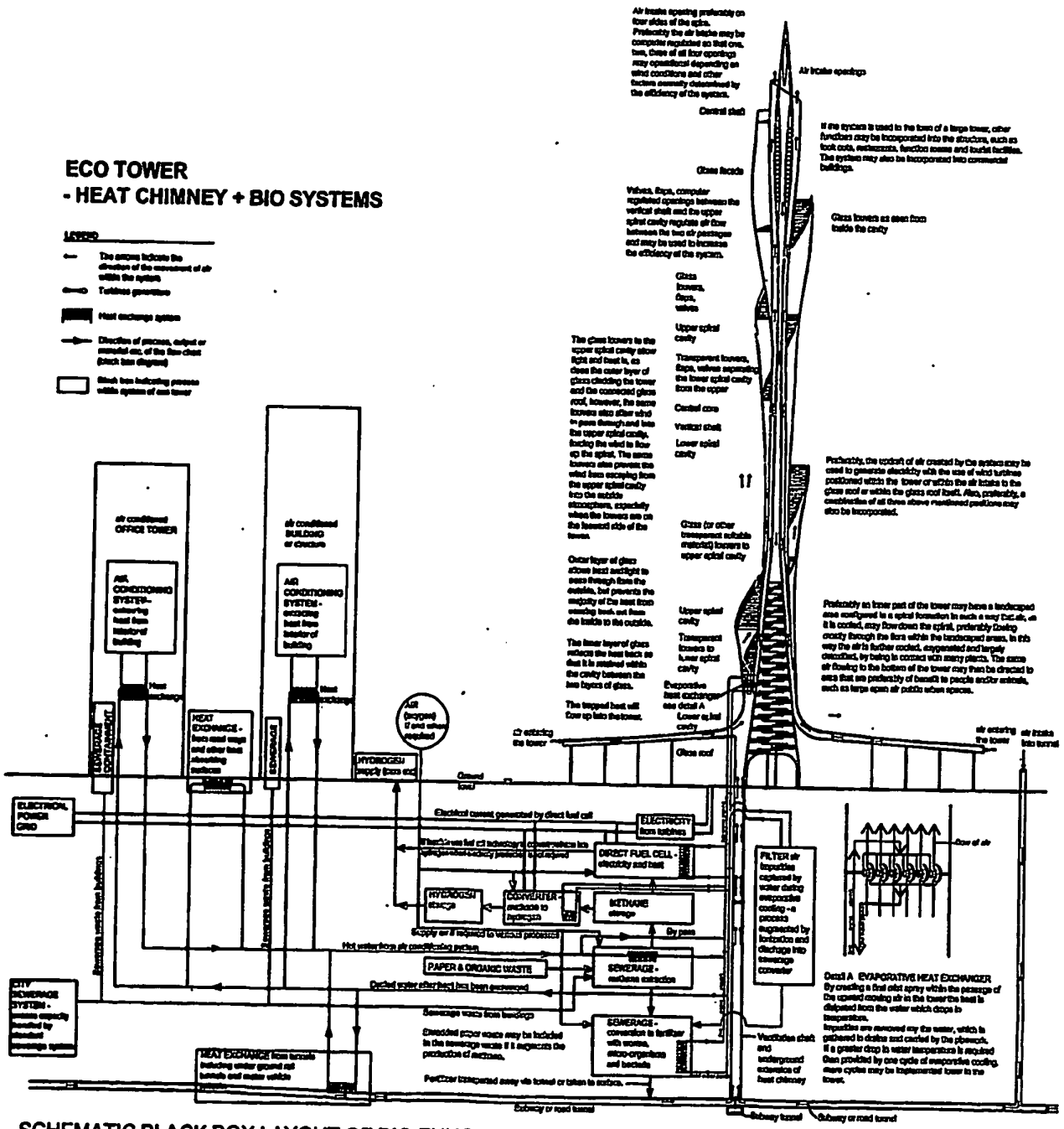
Normally water heated by the said air conditioning systems would be piped to the tower and the heat released through a process that uses the 'evaporative effect' to separate the heat from the water and release it into the air and thereby cooling the water. This cooled water should preferably be returned to the air conditioning system(s) from which they came and operate on a continuous cycle.

Refrigerants or a suitable gas may also be used to transport the [illegible] to the tower from nearby structures. Any other feasible means of transferring heat from nearby structures to the tower may also be used.

The heat gathered should preferably be released in the tower in such a manner as to maximize the upward flow of air and thereby maximize the capacity of the system to generate electricity.

SCHEMATIC BLACK BOX LAYOUT OF BIO FUNCTION RELATED TO CONCEPTUAL SECTION OF THE TOWER

# ECO TOWER
## - HEAT CHIMNEY + BIO SYSTEMS




SCHEMATIC BLACK BOX LAYOUT OF BIO FUNCTION RELATED TO CONCEPTUAL SECTION OF THE TOWER

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